

CLAIMS

What is claimed is:

1. A system, comprising:
 2. a rotating shaft having shaft movement parameters;
 3. an incremental shaft encoder to convert the shaft
 4. movement parameters of the rotating shaft into differentially
 5. encoded electrical signals suitable for processing;
 6. a first optical converter to convert the differentially
 7. encoded electrical signals into optical signals;
 8. a plurality of optical conductors to carry the optical
 9. signals; and
 10. a second optical converter to receive and convert the
 11. optical signals back into electrical signals.

1. 2. The system of claim 1, wherein said plurality of
2. optical conductors includes fiber optic cables.

1. 3. The system of claim 1, further comprising:
 2. an optical coupler configured to couple the shaft
 3. movement parameters to the incremental shaft encoder.

1 4. The system of claim 1, wherein the first optical
2 converter includes transient over-voltage protection of the
3 differentially encoded electrical signals.

1 5. The system of claim 4, wherein the first optical
2 converter includes level shifting of the input voltage of the
3 differentially encoded electrical signals.

1 6. The system of claim 1, wherein the first optical
2 converter includes a differential-to-single converter
3 configured to convert the differentially encoded electrical
4 signals to single-ended electrical signals.

1 7. The system of claim 6, wherein the first optical
2 converter includes a plurality of optical couplers to couple
3 the single-ended electrical signals to the optical conductors
4 for transmission.

1 8. The system of claim 1, wherein the second optical
2 converter includes a plurality of optical couplers to receive
3 the optical signals from the optical conductors, and to
4 convert the optical signals to single-ended electrical
5 signals.

TOP SECRET//COMINT//FOUO

1 9. The system of claim 1, wherein the second optical
2 converter includes a single-to-differential converter
3 configured to convert the single-ended electrical signals to
4 differentially encoded electrical signals.

1 10. A method, comprising:
2 receiving differentially encoded shaft encoder signals;
3 converting the differentially encoded shaft encoder
4 signals into single-ended electrical signals;
5 converting the single-ended electrical signals into
6 optical signals; and
7 transmitting the optical signals through optical
8 conductors.

1
1 11. The method of claim 10, further comprising:
2 coupling shaft movement parameters of a rotating shaft.

1 12. The method of claim 11, further comprising:
2 converting the coupled parameters into electrical
3 signals.

1 13. The method of claim 12, further comprising:
2 differentially encoding the electrical signals.

1 14. The method of claim 10, further comprising:
2 receiving the optical signals from the optical
3 conductors.

1 15. The method of claim 14, further comprising:
2 converting the optical signals into single-ended
3 electrical signals.

1 16. The method of claim 15, further comprising:
2 differentially encoding the single-ended electrical
3 signals.

TOP SECRET//SI//TODAY